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Labor Market Analysis

Information Systems Management



Prepared by the Central Valley/Mother Lode Center of Excellence

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Summary

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for information systems management. Five occupations related to information systems management were identified for Reedley College:

- Computer User Support Specialists (SOC 15-1151)
- Network and Computer Systems Administrators (SOC 15-1142)
- Computer Network Support Specialists (SOC 15-1152)
- Database Administrators (SOC 15-1141)
- Information Security Analysts (SOC 15-1122)

Key findings:

- **Occupational demand** — Nearly 4,000 workers were employed in jobs related to information systems management in 2018 in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. The largest occupation is computer user support specialists with 2,077 workers in 2018, a projected growth rate of 10% over the next five years, and 218 annual openings.
- **Wages** — Information security analysts, have the highest earnings, a median wage of \$41.42/hour in the subregion and \$24.39/hour in the region.
- **Employers** — Employers with the most job postings in the subregion are Lockheed Martin Corporation, US Government, and Best Buy.
- **Job titles** — The most common occupational title in job postings in the subregion is computer user support specialist. The most common job title is systems administrator.
- **Skills and certifications** — The top baseline skill is troubleshooting, the top specialized skill is customer service, and the top software skill is Microsoft Office. The most in-demand certification is a driver's license.
- **Education** — Some college, no degree is typically required for computer user support specialists and an associate degree is typically required for computer network support specialists. The three remaining occupations typically require a bachelor's degree.
- **Supply** — Analysis of postsecondary completions in the region shows that on average 44 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 312 trained workers in the subregion and 570 workers in the region. The Center of Excellence recommends that Reedley College work with the ICT/DM Regional Director, the college's advisory board, and local industry in the development of programs to address the shortage of information systems management workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Reedley College to provide labor market information for information systems management. Review of the Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP) found the following programs are appropriate for this analysis:

- Computer Infrastructure and Support-070800 (TOP)
- Computer Networking-070810 (TOP)
- 11.0901 - Computer Systems Networking and Telecommunications (CIP)
- 11.1006 - Computer Support Specialist (CIP)

The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the South Central Valley/Southern Mother Lode (SCV/SML) subregion is \$10.30/hour.¹

Analysis of the program and occupational data related to information systems management resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System titles and codes used in this report are:

- Computer User Support Specialists (SOC 15-1151)
- Network and Computer Systems Administrators (SOC 15-1142)
- Computer Network Support Specialists (SOC 15-1152)
- Database Administrators (SOC 15-1141)
- Information Security Analysts (SOC 15-1122)

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

Computer User Support Specialists

Job Description: Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, or via telephone or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.

Sample Job Titles: Computer Specialist, Computer Support Specialist, Computer Technician, Desktop Support Technician, Help Desk Analyst, Help Desk Technician, Information Technology Specialist (IT Specialist), Network Technician, Support Specialist, Technical Support Specialist

Knowledge: Computers and Electronics, Customer and Personal Service, English Language, Telecommunications, Engineering and Technology

Skills: Active Listening, Reading Comprehension, Speaking, Complex Problem Solving, Critical Thinking

Network and Computer Systems Administrators

Job Description: Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Monitor network to ensure network availability to all system users and may perform necessary maintenance to support network availability. May monitor and test Web site performance to ensure Web sites operate correctly and without interruption. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software. May supervise

¹ The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

computer user support specialists and computer network support specialists. May administer network security measures.

Sample Job Titles: Information Analyst, Information Systems Manager (IS Manager), Information Technology Specialist (IT Specialist), LAN Specialist (Local Area Network Specialist), Local Area Network Administrator (LAN Administrator), Network Administrator, Network Coordinator, Network Manager, Network Specialist, Systems Administrator
Knowledge: Computers and Electronics, English Language, Customer and Personal Service, Engineering and Technology, Mathematics
Skills: Critical Thinking, Judgment and Decision Making, Reading Comprehension, Systems Analysis, Active Listening

Computer Network Support Specialists

Job Description: Analyze, test, troubleshoot, and evaluate existing network systems, such as local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Perform network maintenance to ensure networks operate correctly with minimal interruption.

Sample Job Titles: Computer Network Specialist, IT Consultant (Information Technology Consultant), Network Engineer, Network Specialist, Network Support Specialist, Network Technical Analyst, Network Technician, Personal Computer Network Analyst, Senior IT Assistant (Senior Information Technology Assistant), Systems Specialist

Knowledge: Computers and Electronics, Telecommunications, Customer and Personal Service, Engineering and Technology, English Language

Skills: Critical Thinking, Active Listening, Judgment and Decision Making, Reading Comprehension, Active Learning

Database Administrators

Job Description: Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. May plan, coordinate, and implement security measures to safeguard computer databases.

Sample Job Titles: Data Architect, Database Administration Manager, Database Administrator (DBA), Database Analyst, Database Coordinator, Database Developer, Database Programmer, Information Systems Manager, Management Information Systems Director (MIS Director), System Administrator

Knowledge: Computers and Electronics, English Language, Telecommunications, Mathematics, Clerical

Skills: Critical Thinking, Complex Problem Solving, Active Learning, Active Listening, Judgment and Decision Making

Information Security Analysts

Job Description: Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses.

Sample Job Titles: Data Security Administrator, Information Security Officer, Information Security Specialist, Information Systems Security Analyst, Information Systems Security Officer, Information Technology Security Analyst (IT Security Analyst), Information Technology Specialist, Network Security Analyst, Security Analyst, Systems Analyst

Knowledge: Computers and Electronics, English Language, Administration and Management, Engineering and Technology, Telecommunications

Skills: Reading Comprehension, Critical Thinking, Active Listening, Complex Problem Solving, Speaking

Occupational Demand

The South Central Valley/Southern Mother Lode subregion employed 3,991 workers in information systems management occupations in 2018 (Exhibit 1). The largest occupation is computer user support specialists with 2,077 workers in 2018. This occupation is projected to grow by 10% over the next five years and has the greatest number of projected annual openings, 218.

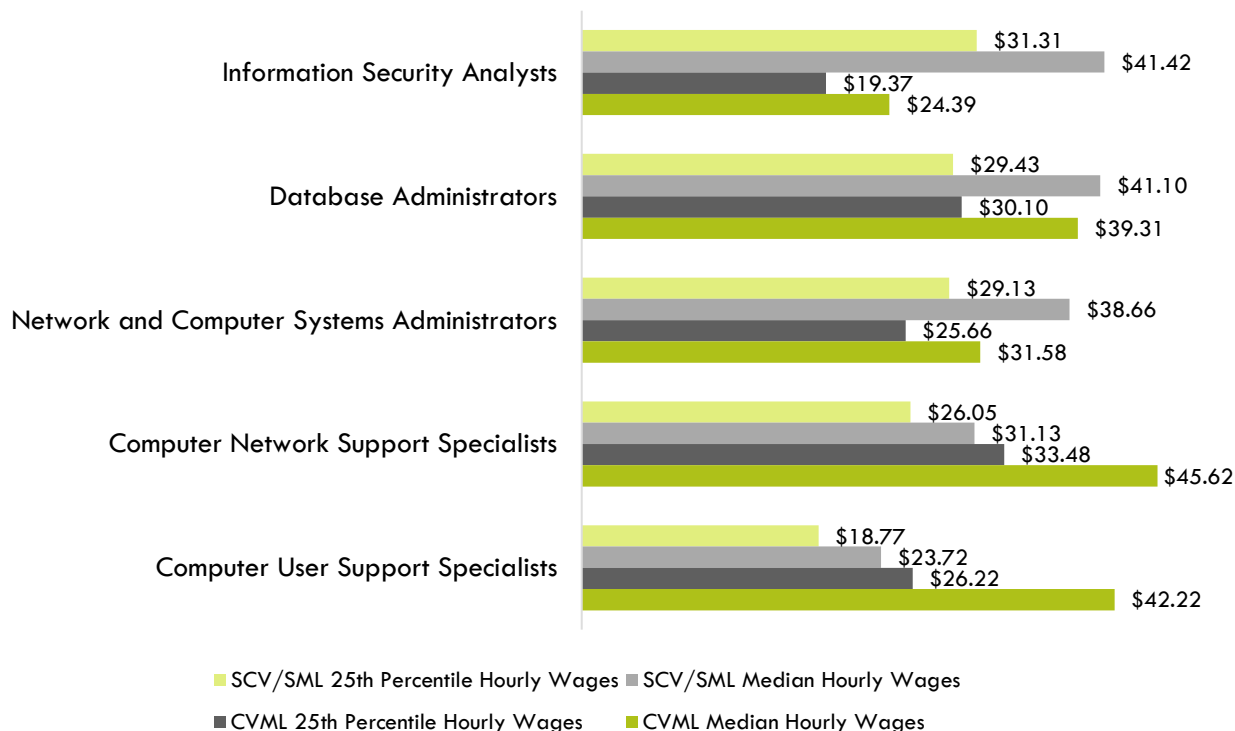
Exhibit 1. Information systems management employment and occupational projections in the SCV/SML subregion

| Occupation | 2018 Jobs | 2023 Jobs | 5-year Change | 5-year % Change | Annual Openings |
|---|--------------|--------------|---------------|-----------------|-----------------|
| Computer User Support Specialists | 2,077 | 2,276 | 199 | 10% | 218 |
| Network and Computer Systems Administrators | 984 | 1,039 | 55 | 6% | 83 |
| Computer Network Support Specialists | 561 | 601 | 40 | 7% | 55 |
| Database Administrators | 213 | 235 | 22 | 10% | 20 |
| Information Security Analysts | 155 | 186 | 31 | 20% | 18 |
| Total | 3,991 | 4,337 | 346 | 9% | 395 |

Wages

Exhibit 2 compares the entry-level and experienced wages of the information systems management occupations. Information security analysts, have the highest earnings, a median wage of \$41.42/hour in the subregion and \$24.39/hour in the region.

Exhibit 2. Entry-level and experienced wage comparison in the SCV/SML subregion and region



Job Postings

There were 1,496 job postings for the five occupations in the SCV/SML subregion from August 2019 to January 2020. The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of information systems management by number of job postings

| Employer | Job Postings |
|-----------------------------------|--------------|
| Lockheed Martin Corporation | 44 |
| US Government | 24 |
| Best Buy | 22 |
| Dignity Health | 19 |
| Northrop Grumman | 19 |
| Anthem Blue Cross | 17 |
| US Department of Treasury | 17 |
| Arctic Slope Regional Corporation | 16 |
| General Dynamics | 16 |
| Smartronix Incorporated | 15 |

Job posting analysis also included the top industries hiring positions related to information systems management (Exhibit 4).

Exhibit 4. Top industries for information systems management by number of job postings

| Industry | Job Postings |
|--|--------------|
| Employment Services | 140 |
| Aerospace Product and Parts Manufacturing | 65 |
| Executive, Legislative, and Other General Government Support | 53 |
| General Medical and Surgical Hospitals | 45 |
| Elementary and Secondary Schools | 38 |
| Insurance Carriers | 32 |
| Colleges, Universities, and Professional Schools | 30 |
| Computer Systems Design and Related Services | 28 |
| National Security and International Affairs | 26 |
| Electronics and Appliance Stores | 24 |

Job Titles

Exhibit 5 shows how job postings for the targeted occupations in the SCV/SML subregion are distributed across five O*NET OnLine occupations. The occupational title computer user support specialists is listed in the most job postings, 704, followed by network and computer systems administrators, 364 job postings. Note that job postings are heavily dominated by the occupational title computer user support specialists.

Exhibit 5. Top occupational titles in job postings for information systems management

| Occupational Title | Job Postings |
|---|--------------|
| Computer User Support Specialists | 704 |
| Network and Computer Systems Administrators | 364 |
| Information Security Analysts | 183 |
| Database Administrators | 156 |
| Computer Network Support Specialists | 89 |

Analysis of the 1,496 advertised job titles for the targeted occupations reveals the top title is systems administrator, occurring in 116 job postings, followed by information technology specialist, 89 job postings (Exhibit 6).

Exhibit 6. Top job titles by number of job postings for information systems management

| Job Title | Job Postings |
|-----------------------------------|--------------|
| Systems Administrator | 116 |
| Information Technology Specialist | 89 |
| Network Administrator | 59 |
| Information Technology Technician | 48 |
| Help Desk Technician | 46 |
| PC Technician | 43 |
| Computer Technician | 39 |
| Field Service Technician | 37 |
| Help Desk Analyst | 26 |
| Technical Support Specialist | 26 |

Salaries

Exhibit 7 shows the “Market Salaries” for information systems management occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 7. Salaries for information systems management

| Market Salary Percentile | Salary Amount |
|--------------------------|---------------|
| 10th Percentile | 33,143 |
| 25th Percentile | 38,236 |
| 50th Percentile | 55,587 |
| 75th Percentile | 77,160 |
| 90th Percentile | 95,390 |

Education

Of the 1,496 job postings, 819 listed an education level preferred for the positions being filled. Of those, 36% requested a high school diploma or vocational training, 19% requested an associate degree, and 67% requested a bachelor's degree (Exhibit 8).

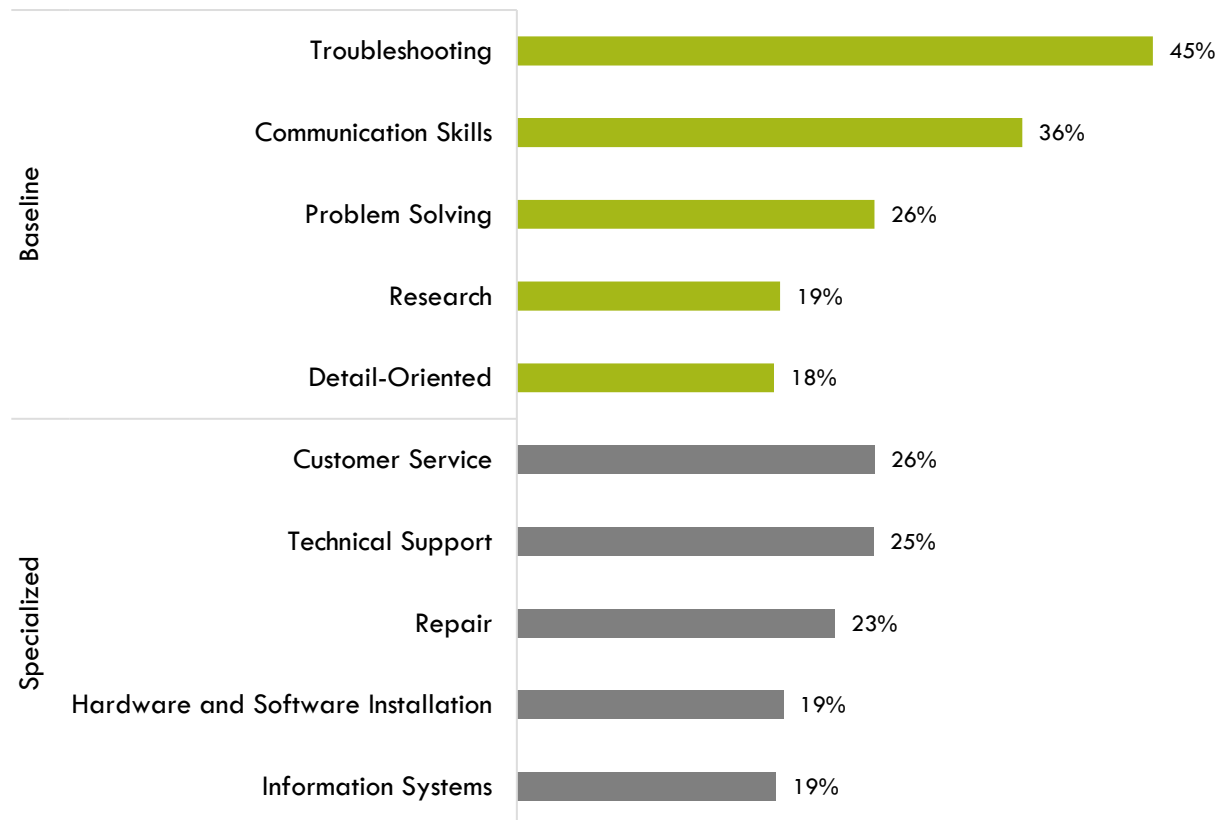
Exhibit 8. Education levels requested in job postings for information systems management

| Education level | % of Job Postings |
|------------------------------------|-------------------|
| Bachelor's degree | 67% |
| High school or vocational training | 36% |
| Associate's degree | 19% |
| Master's degree | 14% |
| Doctoral degree | 7% |

Baseline and Specialized Skills

Exhibit 9 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are troubleshooting, 45% of job postings, communication, 36%, and problem solving, 26%. The top three specialized skills are customer service, 26% of job postings, technical support, 25%, and repair, 23%.

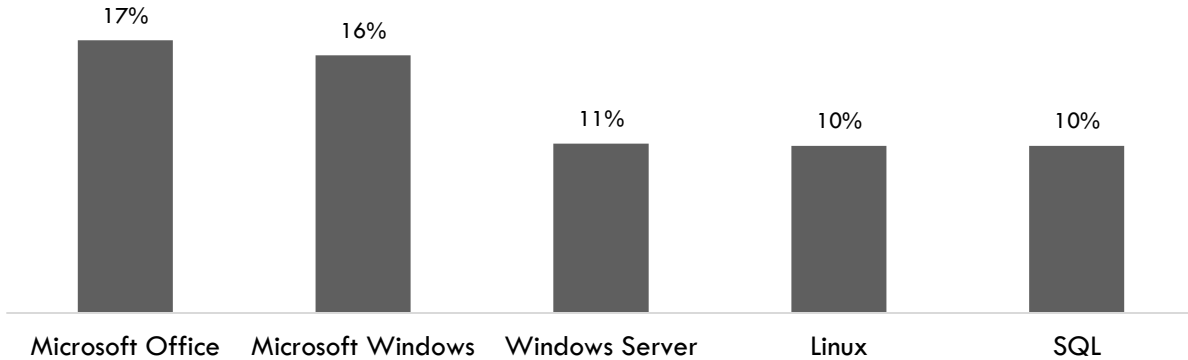
Exhibit 9. In-demand information systems management baseline and specialized skills



Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Office and Windows rank first and second (Exhibit 10).

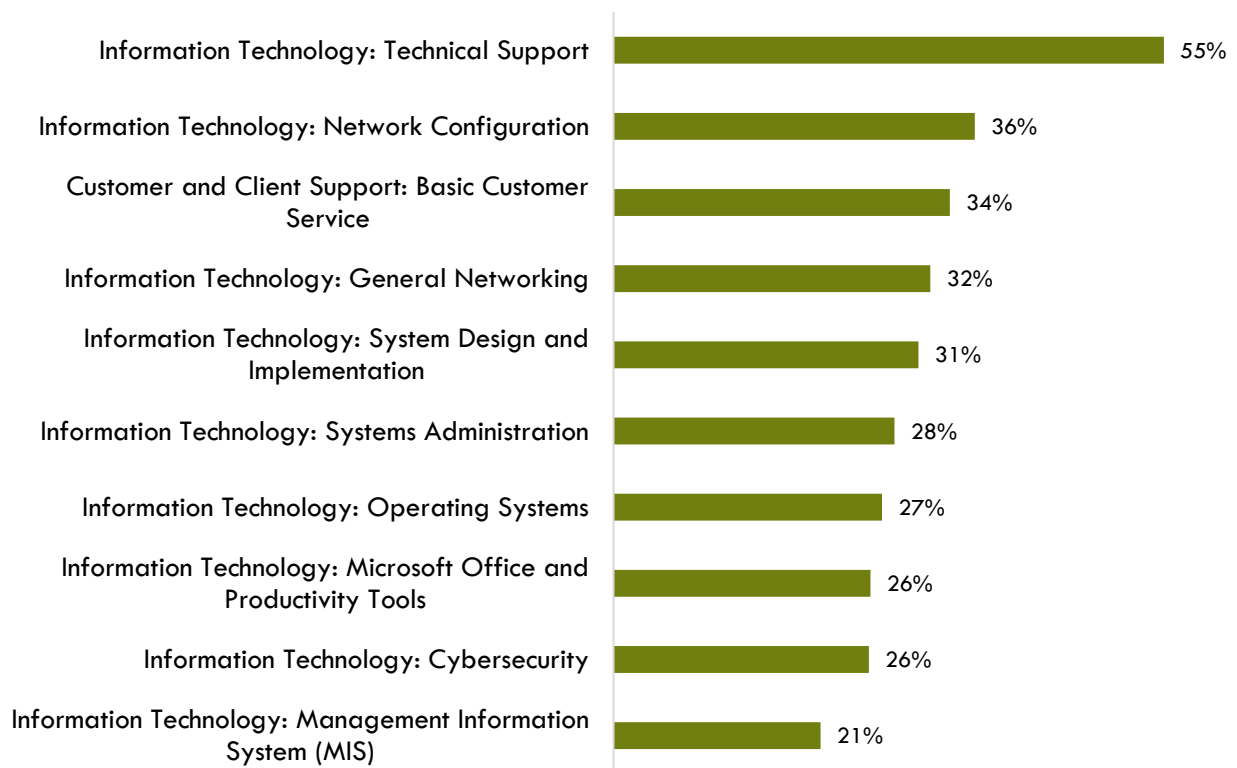
Exhibit 10. In-demand information systems management software skills



Skill Cluster Projections

Of the 1,496 job postings, 1,382 postings contained skill projections. An evaluation of the skill clusters that will have the greatest gains in level of importance shows that the top areas are Information Technology: Technical Support, 55%; Information Technology: Network Configuration, 36%; and Customer and Client Support: Basic Customer Service, 34% (Exhibit 11).

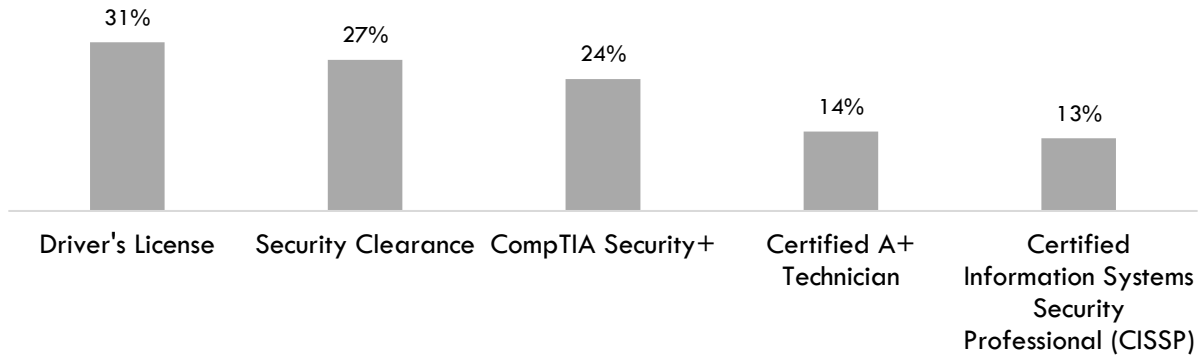
Exhibit 11. Skill cluster projections for information systems management



Certifications

Of the 1,496 job postings, 660 contained certification data. Of those, 31% indicated a need for a driver's license. The next top certifications are security clearance and CompTIA Security+ (Exhibit 12). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 12. Top information systems management certifications requested in job postings



Education, Work Experience & Training

Some college, no degree is typically required for computer user support specialists and an associate degree is typically required for computer network support specialists (Exhibit 13). Three occupations typically require a bachelor's degree, but about a third of workers in two of the occupations have less than a bachelor's degree, making these middle-skill occupations that are relevant to community college education.

Exhibit 13. Education, work experience, training and Current Population Survey results for information systems management occupations²

| Occupation | Typical Entry-level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|---|-------------------------------|--------------------------|-----------------------------|-------|
| Information Security Analysts | Bachelor's degree | Less than 5 years | None | 26.9% |
| Database Administrators | Bachelor's degree | None | None | 22.0% |
| Network and Computer Systems Administrators | Bachelor's degree | None | None | 36.5% |
| Computer User Support Specialists | Some college, no degree | None | None | 41.2% |
| Computer Network Support Specialists | Associate degree | None | None | 41.2% |

² "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

Supply

Analysis of program data from the California Community Colleges Chancellor’s Office Data Mart included the TOP and CIP codes: Computer Infrastructure and Support-070800; Computer Networking-070810; 11.0901 - Computer Systems Networking and Telecommunications; and 11.1006 - Computer Support Specialist. Analysis of the last three years of TOP code data shows that, on average, 44 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 14).

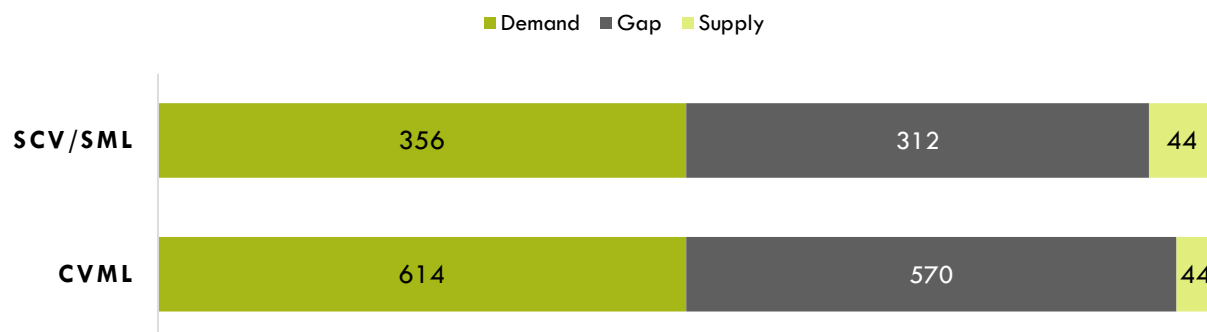
Exhibit 14. Postsecondary supply for information systems management occupations in the region

| TOP/CIP Title - Code | Colleges | Certificates | Degrees | Subtotal |
|--|------------------------------------|--------------|----------|-----------|
| Computer Infrastructure and Support-070800 | Bakersfield | 2 | | 2 |
| | Fresno City | 3 | | 3 |
| | Sequoias | 2 | | 2 |
| Computer Networking-070810 | Clovis Community | | 0 | 0 |
| | Reedley College | 4 | 2 | 6 |
| Computer Systems Networking and Telecommunications-11.0901 | Institute of Technology | 16 | | 16 |
| | San Joaquin Valley College-Visalia | 16 | | 16 |
| Total | | 42 | 2 | 44 |

Gap Analysis

There is an undersupply of 312 information systems management workers in the SCV/SML subregion and 570 workers in the region (Exhibit 15).

Exhibit 15. Information systems management workforce annual demand and supply in the SCV/SML subregion and region



Student Outcomes

Exhibit 16 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to information systems management. Across the region, 76 computer networking students received a degree or certificate, and 12 computer infrastructure and support students transferred. Of the computer networking students who completed a program, 15% reported a median change in earnings, and 74% attained a living wage.

Exhibit 16. Regional metrics for the TOP codes related to information systems management

| Metric | Computer Infrastructure & Support 070800 | Computer Networking 070810 |
|--|---|-------------------------------|
| Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status | 13 | 76 |
| Number of Students Who Transferred | 12 | * |
| Job Closely Related to Field of Study | 60% | 71% |
| Median Change in Earnings | 22% | 15% |
| Attained a Living Wage | 59% | 74% |
| * denotes data not available. | | |

Conclusion

The median wages of the five occupations exceed the SCV/SML subregion's average living wage. There were 1,496 job postings in the past 12 months for occupations related to information systems management in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is troubleshooting, and the top specialized skill is customer service.
- The top software skill is Microsoft Office.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 312 in the SCV/SML subregion and 570 in the region.

Recommendation

Based on these findings, it is recommended that Reedley College work with the ICT/DM Regional Director, the college's advisory board, and local industry in the development of programs to address the shortage of information systems management in the region.

Appendix A: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor’s Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

| Data Type | Source |
|--|---|
| Labor Market Information/Population Estimates and Projections/Educational Attainment | Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com . |
| Typical Education Level and On-the-job Training | Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm . |
| Labor Force, Employment and Unemployment Estimates | California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov . |
| Job Posting and Skills Data | Burning Glass: burning-glass.com/ . |
| Additional Education Requirements/ Employer Preferences | The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org . |

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.